



HEALTH CARE AND THE CLIMATE CRISIS: PREPARING AMERICA'S HEALTH CARE INFRASTRUCTURE

VI. Impact of the Health Sector Supply Chain on the Climate Crisis

This is the sixth part of a Staff Report on the U.S. health system and the climate crisis. [Parts One through Five](#) explored the ways health care providers are responding to the climate crisis. The following part provides an overview of Ranking Member Neal's expanded Request for Information (RFI) relating to the health care supply chain and the climate crisis. [Part Seven](#) analyzes Group Purchasing Organization (GPO) responses to this expanded RFI. [Part Eight](#) includes a discussion of the findings and overview of methods.

PART SIX: KEY FINDINGS

Summary: Scope 3 emissions, representing the value chain of goods and services, constitute 82 percent of total U.S. health sector emissions. These emissions can be challenging to calculate but represent the greatest opportunity for emission reductions. Three Group Purchasing Organizations representing nearly 80 percent of the U.S. market share responded to a RFI regarding their role in engaging their provider members and suppliers on environmental, social, and governance (ESG) standards.

- Though reporting and accountability standards vary, the vast majority of publicly traded companies publish annual environmental sustainability reports that business partners utilize to influence purchasing decisions.
- Nearly every large hospital and health system in the U.S. is a member of multiple group purchasing organizations (GPOs), to facilitate procurement of medical devices and supplies necessary for care delivery.
- Through their sizable market power, GPOs are well-positioned to hold suppliers and manufactures accountable for reporting and mitigating supply chain emissions.
- On July 28, 2022, Committee on Ways and Means Ranking Member Richard E. Neal extended his climate RFI to solicit feedback from the three largest GPOs nationally (i.e., Vizient, Premier, and HealthTrust), which together represent nearly 80 percent of U.S. market share.
- Of the three GPOs surveyed in this RFI, only one reported holding its suppliers to any ESG standards.



"Working as an intermediary between providers and medical suppliers, GPOs are uniquely positioned to leverage purchasing power and move the health care industry toward more sustainable and socially responsible practices."

- Chair Richard E. Neal, press release, [Neal Expands Climate RFI to Health Care Supply Chains](#), July 28, 2022

In 2020, the United States (U.S.) was reported to be the world's second largest national emitter of greenhouse gasses (GHG), totaling 5,222 million metric tons of carbon dioxide equivalents.¹ As discussed in [Part One](#) of this Staff Report, U.S. health sector GHG emissions have risen at a rate of six percent between 2010 and 2018 and accounted for 8.5 percent of total national GHG emissions in 2018. Health care pollution (both GHG and non-GHG) resulted in the loss of 388,000 disability-adjusted life-years in 2018 alone.²

GHG emissions are standardly classified by scope, where scope 1 emissions are from sources that an organization directly controls; scope 2 emissions are indirect and associated with an organization's purchased energy; and scope 3 emissions are indirect and attributable to an organization's value chain. Whereas the term *supply chain* focuses solely on the movement of products and services from a supplier to a purchaser, the term *value chain* encompasses the supply chain and the entire lifecycle of products and services, including all of the internal and external stakeholders involved in the creation of the products and services.³ Table 1 below provides a breakdown of upstream and downstream categories that constitute scope 3 emissions. Scope 3 value-chain emissions often represent most of a given organization's total GHG emissions, regardless of industry and can be challenging to calculate.⁴ As noted in [Part Three](#) of this Staff Report, providers who responded to the RFI reported difficulty in measuring scope 3 emissions.

Table 1. Categories of scope 3 emissions⁵

Upstream	Downstream
<ul style="list-style-type: none">• Purchased goods and services (i.e., emissions from the production of purchased products)• Capital goods (i.e., final products that have an extended life that are used to manufacture, provide, sell, store, or deliver merchandise)• Fuel- and energy-related activities not included in scope 1 and 2• Transportation and distribution (purchased products)• Waste generated in operations• Business travel• Employee commuting• Upstream leased assets (i.e., the operation of leased assets)	<ul style="list-style-type: none">• Transportation and distribution (sold products)• Processing of sold products• Use of sold products• End-of-life treatment of sold products (e.g., landfilling, incineration, and recycling)• Downstream leased assets (i.e., the leasing of assets to another company)• Franchises• Investments



Demand for environmental reporting has increased dramatically over the last decade. In 2018, 115 of the world's largest companies (e.g., Walmart, Unilever, Alphabet, and Samsung), with \$3.3 trillion in combined purchasing power, requested environmental information from more than 5,500 of their key suppliers – an increase from just 14 organizations in 2008.⁶ Those 5,500 key suppliers reported that their emissions-saving activities (e.g., improving energy efficiency and adopting low-carbon energy) amounted to a reduction of 633 million metric tons of carbon dioxide, with an associated annual monetary savings of \$19.3 billion.⁷ In 2019, the U.S. health sector alone accounted for \$3.8 trillion in annual spending – representing 17.6 percent of U.S. gross domestic product – which gives many actors in the U.S. health sector purchasing power to demand higher environmental standards from suppliers and manufacturers.⁸

a. Environmental, social, and governance (ESG) standards

Corporations commonly use corporate social responsibility (CSR) and environmental, social and governance (ESG) frameworks to standardize performance reporting and increase business practice transparency. Presently, such reporting is largely voluntary, and participation can safeguard an organization's reputation and protect long-term viability. CSR and ESG reporting are closely related, with the former qualitatively capturing how the business holds itself socially accountable while the latter focuses on quantitatively measuring the business' social and environmental efforts so that investors and external partners can evaluate a business' performance and impact on society.⁹ The "E" in ESG refers to environmental issues and includes climate risks, carbon emissions, energy efficiency, use of natural resources, pollution, and biodiversity; "S" focuses on human capital, including labor regulations, diversity, equity, inclusion, safety, human rights, and community benefits; and "G" represents board diversity, corruption and bribery, business ethics, compensation policies, and general risk tolerance.¹⁰ The "S" of ESG reporting generally encompasses a business' CSR reporting as well. ESG reporting requires businesses to not only acknowledge the environmental and social impact their operations have on the world, but it also requires that the entity take responsibility for mitigating these negative consequences as part of routine business operations.¹¹ Currently, more than 90 percent of Standard and Poor's 500 U.S. Index Companies (S&P 500) publish some type of annual sustainability report; however, these reports are currently not standardized by a single framework, leading to the potential for the *greenwashing* of environmental efforts.¹²

In the U.S., ESG reporting is voluntary, despite market demands and international requirements driving wide participation.¹³ Environmental reporting has specifically begun transforming purchaser behavior, as companies have started to refuse to procure products from suppliers and manufacturers with poor environmental performance.¹⁴ Growing interest in environmental reporting and demand for corporate accountability and transparency have even prompted action from the U.S. Securities and Exchange Commission (SEC) to propose a rule to standardize ESG reporting for publicly traded companies, which has received mixed feedback from industry.¹⁵ Of companies that voluntarily disclose emissions, 80 percent in Australia and Africa, 71 percent of European



companies, and five percent of companies in North America reported scope 3 emissions.¹⁶ This relatively lower fraction of reporting in North America could put U.S. companies at a disadvantage with investors, who are increasingly concerned with climate-related financial risks.¹⁷ Beginning as early as 2024, large companies based in the European Union (EU) and companies with substantial activity within the EU will be required to report on sustainability efforts under the proposed Corporate Sustainability Reporting Directive (CSRD), with reporting being certified by an accredited independent auditor.¹⁸ Table 2 highlights some of the reporting requirements in the CSRD.

Table 2. Select elements of the EU CSRD requirements¹⁹

- Physical risks, resiliency plans to adapt to different climate scenarios, and progress toward the EU's climate neutrality goal, with scope 1, scope 2, and, where relevant, scope 3 emissions.
- Climate-neutral and circular economy metrics, including energy reduction and increasing energy efficiency.
- Social factors, including working conditions, social partner involvement, collective bargaining, equality, non-discrimination, diversity and inclusion, and human rights. The information should include reporting about forced labor and child labor in their value chains where relevant.
- Governance factors, including a company's administrative, management, and supervisory bodies regarding sustainability matters; expertise and skills to fulfill reporting obligations; and information on a company's internal control and risk management systems in relation to the sustainability reporting process.
- Standards to promote a more integrated view of all the information reporting entities publish to provide a better understanding of the development, performance, position, and impact of a company's efforts.
- Minimum standards across all sectors, while providing for more specific sector-related standards to compare progress and identify similar sustainability-related risks and societal and environmental impacts.

Source: Directive of the European Parliament and of the Council regarding corporate sustainability reporting.

As many industries and companies around the world move toward environmental disclosures, the U.S. health delivery system lags behind, with the exception of a limited number of health care providers reported on in [Part Two](#) and [Part Three](#) of this Staff Report.²⁰ As U.S. hospitals and health systems operate outside the scope of market demands in many respects, some experts argue that requiring ESG reporting is necessary to fortify the health care supply chain, ensure the stable delivery of care, and increase resiliency.²¹ For health care providers to achieve ESG reporting goals that are aimed to ultimately reduce GHG emissions, providers must require that the goods and services they rely upon for care delivery are environmentally friendly.²²

OVERVIEW OF THE HEALTH CARE SUPPLY CHAIN

Scope 3 emissions represent 82 percent of total U.S. health sector emissions, with the largest amount of scope 3 emissions coming from the supply chain.²³ Of U.S. health sector scope 3 emissions, 54 percent is directly attributable to the supply chain of health care-related goods and services, such as the production and delivery of medical supplies.²⁴ This



trend is similar in other countries as well. The largest share of England's National Health Service (NHS) emissions in 2019 were attributable to the supply chain, representing 62 percent of total emissions.²⁵

Although supply chain emissions are the largest source category for the health sector, they are challenging to influence. The literature points to two broad approaches to curbing scope 3 emissions: 1) Reducing unnecessary consumption of goods and services (e.g., through reducing drug wastage or refurbishing and reusing devices), and 2) shifting to low-carbon goods and services (e.g., through specifying so-called green concrete, low-carbon data services, or plant-based diets).²⁶

a. Reducing unnecessary consumption of goods and services

One strategy to reduce the unnecessary consumption of goods is to transition to a *circular economy*. This approach focuses on keeping manufactured products in circulation to minimize resource and environmental costs over time through repeated use while also improving the resilience of the supply chain.²⁷ In contrast, a *linear economy* – more characteristic of the current U.S. health care supply chain – involves discarding manufactured products after a single use, resulting in increased health care costs, energy use, waste, and pollution.²⁸ A linear supply chain is vulnerable to interruptions from extreme weather events disrupting manufacturing and distribution, as well as demand fluctuations and supply shortages. For example, many providers relying on single-use personal protective equipment (PPE) during the COVID-19 pandemic-related shortages found themselves either struggling to secure enough supplies and/or paying exorbitant prices. However, one health system in Arizona demonstrated the potential of circular economy practices by switching to reusable isolation gowns that could be reused over 125 times, thereby securing necessary PPE and saving \$600,000.²⁹

Globally, the incremental shift to a more circular health care supply chain is evident in the market for single-use medical device reprocessing, which is projected to reach \$3.3 billion by 2026 (the current market is \$1.8 billion).³⁰ In addition to reducing GHG emissions by cutting production of disposable products that could instead be reused, *reprocessing could also significantly reduce costs*. According to the Association of Medical Device Reprocessors, U.S. hospitals could save \$2.28 billion by maximizing the use of reprocessed single-use devices – which cost 25 to 40 percent less than single-use items – and reducing the need for medical waste disposal.³¹ In 2020, U.S. hospitals saved \$372 million by using reprocessed devices and diverted nearly 12 million pounds of waste from landfills.³² On a smaller scale, one health system in North Carolina has created \$750,000 in annual savings by using reprocessed vascular catheters.³³

Despite potential cost savings and environmental benefits, there are challenges to transitioning the health care supply chain to a circular economy. In the U.S., a product's manufacturer decides whether to label a device as single-use or reusable. But if a manufacturer wants to label a device as reusable, it must provide sufficient data



demonstrating to the Food and Drug Administration (FDA) that the device can be cleaned and sterilized without impairing its function.³⁴ A device may be labeled as single use because the manufacturer believes it cannot be safely and reliably used more than once; or, because the manufacturer chooses not to conduct the studies needed to demonstrate that the device can be labeled as reusable.³⁵ *In other words, there is a different burden of proof required to label a device as single-use compared to reusable in the U.S.*

Even if it were easier to label a device reusable in the U.S., manufacturers may not necessarily choose to label them as such. In the 1990s, health care equipment manufacturers began to change the labels on certain devices from reusable to single-use, despite a lack of any significant changes in design, performance, or material that would preclude safe reuse.³⁶ A 2008 Government Accountability Office (GAO) report reviewing the FDA's analysis and oversight of the safety and efficacy of over 70 different types of reprocessed single-use medical devices (e.g., catheters, drill bits, compression sleeves, etc.) concluded that there was no evidence that reprocessed devices presented an elevated health risk to patients.³⁷ Some hospitals perceived this shift in labeling to be a marketing strategy aimed at increasing sales of new products, without providing additional safety benefits.³⁸ Current business models often incentivize manufacturers to intentionally manufacture obsolescence into medical devices (e.g., labeling safely reusable devices as single-use or using flimsy construction to limit product lifespans) to promote consumption and maximize profits, further entrenching a linear economy.³⁹ *Consequently, reducing unnecessary consumption and moving toward a circular economy requires not only regulatory changes but also innovative business models that realign incentives for manufactures.*

b. Shifting to low-carbon goods and services

Transitioning to low-carbon goods and services is another strategy to reduce scope 3 emissions. According to a report from the World Economic Forum, 40 percent of supply chain emissions could be eliminated with measures that either yield savings or cost less than 10 euros per ton of CO₂ equivalents through efficient and renewable power, transitioning to a circular economy, and logistic optimization.⁴⁰ *Logistic optimization* includes reducing the distance goods travel through improved route-planning systems and using more efficient modes of transportation (e.g., rail over air freight or the use of electric fleet vehicles).⁴¹ The passage of the *Inflation Reduction Act* included tax credits for businesses to incentivize and purchase commercial electric vehicles and fuel cell electric vehicles, which began January 1, 2023.⁴²

Global examples of private- and public-sector transitions to lower carbon goods abound. Pharmaceutical company AstraZeneca is transitioning to 100 percent renewable energy from the production of biomethane to power its production sites in Europe and ultimately lowering carbon embedded in pharmaceuticals.⁴³ Transitioning to a fully decarbonized electric grid would not only zero-out scope 2 emissions from the direct purchasing of electricity, but this effort would also have an even greater absolute effect on



scope 3 emissions by dramatically reducing emissions embedded in the value chain.⁴⁴ Another opportunity to transition to lower carbon goods exists in the inhaler market used to treat conditions like asthma and chronic obstructive pulmonary disorder. In the U.S., 75 percent of inhaler prescriptions are for pressurized metered-dose inhalers (pMDIs).⁴⁵ Hydrofluorocarbons propellants in pMDIs used to deliver medications are potent GHGs.⁴⁶ These types of inhalers alone represent three percent of the total emissions for England's NHS.⁴⁷ Though pMDIs are commonly prescribed, lower carbon alternative drug delivery systems exist like dry powder inhalers (DPIs) that emit up to 25 times fewer CO₂ equivalents than pMDIs across the life cycle of the devices.⁴⁸ In Sweden, 90 percent of inhaler prescriptions are DPIs, suggesting that these DPIs are safe and effective alternatives when clinically indicated.⁴⁹

c. How other countries are influencing the health care supply chain

Beyond the EU's CSRD (see Section A above), other European countries have national laws that broadly influence the environmental performance of supply chain business practices. For example, Norway has a Public Procurement Law that requires public entities to adapt their procurement practices to reduce environmental impacts, promote climate friendly solutions, and protect human rights.⁵⁰ However, England is the only country that is currently targeting the health care supply chain directly as part of a national strategy. England's NHS is investing in environmentally friendly procurement through its more than 80,000 contracts with different suppliers and has produced tools to guide sustainable procurement, including guidance on carbon footprint reporting and reports identifying the most carbon-intensive purchased items and pharmaceuticals.⁵¹ In November 2022 at the United Nations Climate Conference (COP27), it was announced that the U.S. Department of Health and Human Services would be working collaboratively with England's NHS to align environmentally preferred procurement goals between the two nations, which the two continued to build upon at the 2023 conference.⁵² Table 3 below highlights the NHS's strategies to reduce supply chain emissions. As shown below, the two largest opportunities for scope 3 emission reductions for the NHS come from ensuring suppliers of non-pharmaceutical goods and pharmaceutical products meet NHS-set net-zero emission targets by the end of the decade.⁵³



Table 3. England's NHS interventions to reduce supply chain emissions to zero⁵⁴

England NHS total supply chain emissions: 16,531 kilotons of CO2 equivalents (ktCO2e)	
Non-pharmaceutical suppliers meet NHS commitments	-4,458 (ktCO2e)
Pharmaceutical suppliers meet NHS commitments	-4,203 (ktCO2e)
Forecasted change in activity	-1,865 (ktCO2e)
Process and product innovation	-1,488 (ktCO2e)
Research, innovation, and offsetting	-865 (ktCO2e)
Commissioned services meet NHS commitments	-785 (ktCO2e)
Electrified freight transport	-533 (ktCO2e)
Decarbonize construction	-525 (ktCO2e)
Switch to bio-based polymers	-498 (ktCO2e)
Reduce use of paper	-417 (ktCO2e)
Reduce single-use plastics	-224 (ktCO2e)
Switch to plant-forward diets	-220 (ktCO2e)
Device reuse and refurbishment	-202 (ktCO2e)
Metal instrument reprocessing	-157 (ktCO2e)
Reduce food waste	-92 (ktCO2e)
Total	0 (ktCO2e)

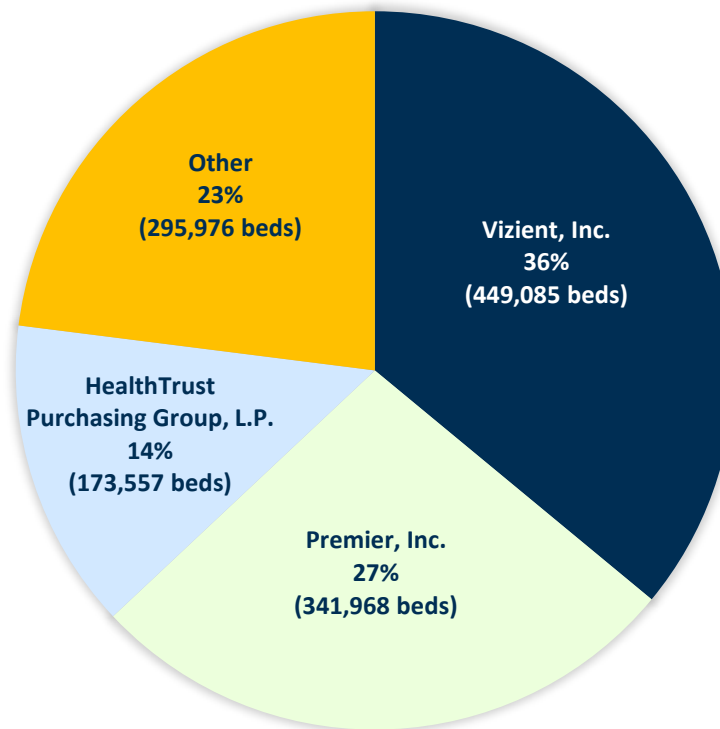
Source: *Delivering a Net Zero National Health Service*

d. Group purchasing organizations in the U.S. health care system

Group Purchasing Organizations (GPOs) are entities that aggregate purchasing of goods on behalf of their members (e.g., hospitals and other health care facilities) to maximize purchasing power and achieve cost savings for myriad devices and products.⁵⁵ Nearly every American hospital and the vast majority of non-acute care centers hold membership with at least one GPO, with the average hospital belonging to two to four GPOs.⁵⁶ Of the top 10 largest GPOs in the health care sector, just three represent 77 percent of the total staffed beds (964,610), as shown in Figure 1.⁵⁷ Vizient, Inc., represents 35.8 percent (449,085) of these beds, followed by Premier, Inc., and HealthTrust Purchasing Group, L.P., representing 27.3 percent (341,968) and 13.9 percent (173,557) staffed beds, respectively, as shown in Figure 1.



Figure 1. Market share of the top 10 GPOs, by staffed beds



Source: Definitive Healthcare: Top 10 GPOs by staffed beds.

Vizient’s membership alone represents nearly \$110 billion in annual purchasing volume, encompassing more than 50 percent of the nation’s acute care providers (including 97 percent of the nation’s academic medical centers) and more than 20 percent of ambulatory care providers.⁵⁸ Such large market power presents the opportunity for GPOs to require medical device suppliers and manufactures to reduce their carbon footprint or offer more environmentally friendly products for their members.

OVERVIEW AND PURPOSE

Given the limited information available on the U.S. health care system’s impact on the climate crisis and related actions to address it from individual provider and supply chain levels, in March 2022, Committee on Ways and Means Ranking Member Richard E. Neal sent out a [RFI](#) to hospitals, health systems, and other health providers to better understand how climate events have impacted the health sector, as well as steps the health care sector is taking to address its role in mitigating the climate crisis. The results from an analysis of those responses were presented in [Parts One through Five](#) of this Staff Report. In July 2022, the then-Chair [expanded the RFI](#) to the three largest GPOs to further explore the health care supply chain.



Broadly, the purpose of the latest RFI was to solicit feedback from the three largest GPOs on the ways extreme weather events are impacting the health care supply chain and approaches they have undertaken to curb GHG emissions by leveraging their purchasing power. Staff created the [survey](#) instrument to inform the RFI based on a review of the extant literature and expert input. Ultimately, Ranking Member Neal's RFI seeks to expand public understanding of the range of responses to the climate crisis and pinpoint places where the government – federal, state, and local – can engage on these issues to ensure the U.S. health system remains resilient in the face of increasing extreme weather events while curbing its carbon footprint. *For a detailed summary of the methodology employed in survey development and the creation of an analytic plan, please see [Part Eight](#) of this report.*

SUMMARY STATISTICS

As shown in Table 4, each of the surveyed GPOs contracts with a variety of health care providers, including multi-hospital health systems, health systems, independent hospitals, and nursing homes. Two of the three GPOs also reported contracting with multi-facility dialysis companies. All GPOs reported that they have contracts with the same types of suppliers for their members, such as brand-name suppliers, generic pharmaceutical manufacturers, distributors, wholesalers, medical supply manufactures, medical device manufacturers, commercial reprocessing companies, and food vendors. Only one GPO reported that it required its contracted suppliers to adhere to ESG standards. *An analysis of specific responses to the RFI are included in [Part Seven](#) of this report.*



Table 4. Characteristics of Group Purchasing Organizations (n = 3)

Variable	HealthTrust Purchasing Group, L.P.	Premier, Inc.	Vizient, Inc.
Size			
Membership	1,500 acute care hospitals 60,000 non-acute members	4,400 U.S. hospitals & health systems 250,000 other providers & organizations	3,500 health systems (60% of the acute care hospitals in the country, 20% of the ambulatory market)
Number of staffed beds represented (self-reported)	191,000	550,000	n/a
GPO Member Organization Types			
Multi-hospital health system	Yes	Yes	Yes
Health system	Yes	Yes	Yes
Independent hospital	Yes	Yes	Yes
Multi-facility dialysis company	No	Yes	Yes
Nursing home corporation	Yes	Yes	Yes
Other	Yes, Physician Clinics, Free-standing ERs, Urgent Care Centers, Retail Pharmacies	Yes, Home infusion, long-term care pharmacies	No
Type of Suppliers Contracted			
Brand name	Yes	Yes	Yes
Generic pharmaceutical Manufacturers	Yes	Yes	Yes
Distributors	Yes	Yes	Yes
Wholesalers	Yes	Yes	Yes
Medical Supply Manufacturers	Yes	Yes	Yes
Medical Device Manufacturers	Yes	Yes	Yes
Commercial reprocessing companies	Yes	Yes	Yes
Food vendors	Yes	Yes	Yes
Other	Yes, suppliers that provide services (e.g. biomedical engineering service, security services, landscaping/snow removal services, etc.)	Yes, third-party purchased services companies	No
Require suppliers to adhere to ESG standards	No	Yes	No



- ¹ *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, U.S. ENVIRONMENTAL PROTECTION AGENCY (Apr. 14, 2022), <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>; Mathew J. Eckelman et al., *Health Care Pollution and Public Health Damage in The United States: An Update*, 39:12 HEALTH AFFAIRS (2020), <https://www.healthaffairs.org/doi/10.1377/hlthaff.2020.01247>.
- ² Mathew J. Eckelman et al., *Health Care Pollution and Public Health Damage in The United States: An Update*, 39:12 HEALTH AFFAIRS (2020), <https://www.healthaffairs.org/doi/10.1377/hlthaff.2020.01247>.
- ³ *What is a value chain? Definitions and characteristics*, CAMBRIDGE INST. FOR SUSTAINABILITY LEADERSHIP, <https://www.cisl.cam.ac.uk/education/graduate-study/pgcerts/value-chain-defs> (last visited Nov. 16, 2022).
- ⁴ *Scope 1 and Scope 2 Inventory Guidance*, U.S. ENVIRONMENTAL PROTECTION AGENCY (Sept. 9, 2022), <https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance>; *Scope 3 Inventory Guidance*, U.S. ENVIRONMENTAL PROTECTION AGENCY (May 12, 2022), <https://www.epa.gov/climateleadership/scope-3-inventory-guidance>.
- ⁵ *Technical Guidance for Calculating Scope 3 Emissions (version 1.0)*, GREENHOUSE GAS PROTOCOL at 7-10 (2013), https://ghgprotocol.org/sites/default/files/standards/Scope3_Calculation_Guidance_0.pdf.
- ⁶ *A decade of purchasing power brings sustainability up the corporate agenda, as world's biggest business cut 633 million metric tonnes of CO2 from their supply chains*, CDP (Feb. 6, 2019), <https://www.cdp.net/en/articles/supply-chain/a-decade-of-purchasing-power-brings-sustainability-up-the-corporate-agenda-as-worlds-biggest-businesses-cut-633-million-metric-tonnes-of-co2-from-their-supply-chains>.
- ⁷ *Cascading Commitments: Driving ambitious action through supply chain engagement*, CDP (2019), https://cdn.cdp.net/cdp-production/cms/reports/documents/000/004/072/original/CDP_Supply_Chain_Report_2019.pdf?155049055.
- ⁸ Micah Hartman et al., *National Health Care Spending In 2020: Growth Driven By Federal Spending In Response To The COVID-19 Pandemic*, 41:1 HEALTH AFFAIRS (Dec. 15, 2021), <https://doi.org/10.1377/hlthaff.2021.01763>.
- ⁹ Carl Hung, *Three Reasons Why CSR And ESG Matter To Businesses*, FORBES (Sept. 23, 2021), <https://www.forbes.com/sites/forbesbusinesscouncil/2021/09/23/three-reasons-why-csr-and-esg-matter-to-businesses/?sh=599b43b139b9>.
- ¹⁰ *ESG Reporting*, EY, https://www.ey.com/en_us/esg-reporting?WT.mc_id=10650832&AA.tsrc=paidsearch&msclkid=9b69d85a9e251b0926e0bb264978eb6f (last visited Nov. 12, 2022).
- ¹¹ Emily Senay et al., *What Can Hospitals Learn from the Coca-Cola Company? Health Care Sustainability Reporting*, 3:3 NEJM CATALYST INNOVATIONS IN CARE DELIVERY at 6 (2022), <https://doi.org/10.1056/CAT.21.0362>.
- ¹² *90% of S&P 500 Index Companies Publish Sustainability Reports in 2019, G&A Announces in its Latest Annual 2020 Flash Report*, GOVERNANCE & ACCOUNTABILITY INST. INC. (July 16, 2020), <https://www.ga-institute.com/storage/press-releases/article/90-of-sp-500-index-companies-publish-sustainability-reports-in-2019-ga-announces-in-its-latest-a.html>.
- ¹³ *Id.* at 7.
- ¹⁴ *A decade of purchasing power brings sustainability up the corporate agenda, as world's biggest business cut 633 million metric tonnes of CO2 from their supply chains*, *supra* note 6.
- ¹⁵ *Fact Sheet: Enhancement and Standardization of Climate-Related Disclosures*, U.S. SECURITIES AND EXCHANGE COMMISSION, <https://www.sec.gov/files/33-11042-fact-sheet.pdf> (last visited June 14, 2022).
- ¹⁶ Shannon M. Lloyd et al., *Trends Show Companies Are Ready for Scope 3 Reporting with US Climate Disclosure Rule*, WORLD RESOURCES INST. (June 24, 2022), <https://www.wri.org/update/trends-show-companies-are-ready-scope-3-reporting-us-climate-disclosure-rule>.
- ¹⁷ *Id.*
- ¹⁸ *New rules on corporate sustainability reporting: provisional political agreement between the Council and the European Parliament*, EUROPEAN COUNCIL: COUNCIL OF THE EUROPEAN UNION (Jun 30, 2022), <https://www.consilium.europa.eu/en/press/press-releases/2022/06/21/new-rules-on-sustainability-disclosure-provisional-agreement-between-council-and-european-parliament/>.



- ¹⁹ *Directive of the European Parliament and of the Council: amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards to corporate sustainability reporting*, EUROPEAN COUNCIL: COUNCIL OF THE EUROPEAN UNION at 33-8 (June 30, 2022), <https://www.consilium.europa.eu/media/57644/st10835-xx22.pdf>.
- ²⁰ Emily Senay et al., *supra* note 11, at 7.
- ²¹ *How ESG fortifies the supply chain*, MODERN HEALTHCARE, <https://www.modernhealthcare.com/esg/how-esg-fortifies-supply-chain> (last visited Oct. 27, 2022).
- ²² *Id.*
- ²³ Mathew J. Eckelman et al., *supra* note 2, at 2073.
- ²⁴ Jeanette W Chung & David O Meltzer, *Estimate of the carbon footprint of the US health care sector*, 11:302(18) JAMA (2009), <https://jamanetwork.com/journals/jama/fullarticle/184856>.
- ²⁵ Imogen Tennison et al., *Health care's response to climate change: a carbon footprint assessment of the NHS in England*, LANCET PLANET HEALTH (2021), [https://doi.org/10.1016/S2542-5196\(20\)30271-0](https://doi.org/10.1016/S2542-5196(20)30271-0).
- ²⁶ *Id.* at e90.
- ²⁷ Andrea J. MacNeill et al., *Transforming The Medical Device Industry: Road Map To a Circular Economy*, 39:12 HEALTH AFFAIRS AT 2088 (2020), <https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2020.01118>.
- ²⁸ *Id.*
- ²⁹ *How ESG fortifies the supply chain*, *supra* note 25.
- ³⁰ See MEDICAL DEVICE REPROCESSING – GLOBAL MARKET TRAJECTORY & ANALYTICS, GLOBAL INDUSTRY ANALYSTS, INC (2022).
- ³¹ AMDR Deeper Analysis Report on 2020 Data, ASSOC. OF MEDICAL DEVICE REPROCESSORS (May 31, 2022).
- ³² *Id.*
- ³³ Helen Brann & Angela Capone, *A Tale of Two SUD Reprocessing Programs: How Two Similar Health Systems Can Achieve Very Different Savings Results in the EP Lab*, HMP GLOBAL LEARNING NETWORK (Sept. 2015), <https://www.hmpgloballearningnetwork.com/site/eplab/articles/tale-two-sud-reprocessing-programs-how-two-similar-health-systems-can-achieve-very>.
- ³⁴ *Background Information on Medical Device Reprocessing – Now a Best clinical Practice in American Healthcare*, ASSOC. OF MEDICAL DEVICE REPROCESSORS (2013), <https://amdr.org/wp-content/uploads/2013/06/AMDR-Best-Practice-and-Background-for-web-1.pdf>.
- ³⁵ *Id.*
- ³⁶ *Id.*
- ³⁷ *Reprocessed Single-Use Medical Devices: FDA Oversight Has Increased, and Available Information Does Not Indicate That Use Presents an Elevated Health Risk*, U.S. GOV. ACCOUNTABILITY OFFICE (Jan. 20008), <https://www.gao.gov/assets/gao-08-147.pdf>.
- ³⁸ *Background Information on Medical Device Reprocessing – Now a Best clinical Practice in American Healthcare*, ASSOC. OF MEDICAL DEVICE REPROCESSORS (2013), *supra* note 42.
- ³⁹ Andrea J. MacNeill et al., *supra* note 27.
- ⁴⁰ *Net-zero Challenge: The supply chain opportunity*, WORLD ECONOMIC FORUM at 17 (Jan. 2021), https://www3.weforum.org/docs/WEF_Net_Zero_Challenge_The_Supply_Chain_Opportunity_2021.pdf.
- ⁴¹ *Value Change in the Value Chain: Best Practices in Scope 3 Greenhouse Gas Management*, SCIENCE BASED TARGETS at 20 (Nov. 2018), https://sciencebasedtargets.org/resources/files/SBT_Value_Chain_Report-1.pdf.
- ⁴² Alternative Fuels Data Ctr., *Commercial Electric Vehicle (EV) and Fuel Cell Electric Vehicle (FCEV) Tax Credit*, U.S. DEPT. OF ENERGY, <https://afdc.energy.gov/laws/13039> (last visited Dec. 15, 2022).
- ⁴³ AstraZeneca announces partnership to build new renewable energy plant to provide clean heat and power across UK sites, FUTURE BIOGAS (Dec. 14, 2021), <https://www.futurebiogas.com/astrazeneca-announces-partnership-to-build-new-renewable-energy-plant-to-provide-clean-heat-and-power-across-uk-sites/>.
- ⁴⁴ Mathew J. Eckelman et al., *supra* note 2, at 2075.
- ⁴⁵ *Market Characterization of the U.S. Metered Dose Inhaler Industry*, ICF (Sept. 2021), https://www.epa.gov/sites/default/files/2021-03/documents/epa-hq-oar-2021-0044-0002_attachment_1-mdis.pdf.
- ⁴⁶ *The environmental impact of inhalers*, NORTH & EAST DEVON FORMULARY AND REFERRAL (July 3, 2022), <https://northeast.devonformularyguidance.nhs.uk/formulary/chapters/3.-respiratory/the-environmental-impact-of-inhalers>.



-
- ⁴⁷ *Delivering a 'Net Zero' National Health Service*, NHS ENGLAND at 32 (July 2022), <https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net-zero-nhs-july-2022.pdf>.
- ⁴⁸ *The environmental impact of inhalers*, NORTH & EAST DEVON FORMULARY AND REFERRAL (July 3, 2022), <https://northeast.devonformularyguidance.nhs.uk/formulary/chapters/3.-respiratory/the-environmental-impact-of-inhaler>.
- ⁴⁹ Christer Janson et al., *Carbon footprint impact of the choice of inhalers for asthma and COPD*, 75 THORAX at 82 (2020), <http://dx.doi.org/10.1136/thoraxjnl-2019-213744>.
- ⁵⁰ Public Procurement Act § 5 Environment, Human rights and other societal considerations (LOV-2016-06-17-73), <https://lovdata.no/dokument/NL/lov/2016-06-17-73?q=anskaffelsesloven>.
- ⁵¹ Imogen Tennison et al., *Health care's response to climate change: a carbon footprint assessment of the NHS in England*, LANCET PLANET HEALTH (2021), [https://doi.org/10.1016/S2542-5196\(20\)30271-0](https://doi.org/10.1016/S2542-5196(20)30271-0).
- ⁵² *HHS Shares Health Sector Emissions Reduction and Climate Resilience Announcements at COP27*, U.S. DEPT. OF HEALTH & HUMAN SERVS. (Nov. 10, 2022), <https://www.hhs.gov/about/news/2022/11/10/hhs-shares-health-sector-emissions-reduction-climate-resilience-announcements-at-cop27.html>.
- ⁵³ *Delivering a 'Net Zero' National Health Service*, *supra* note 47, at 29.
- ⁵⁴ *Id.*
- ⁵⁵ *What is a GPO?*, HSCA, <https://supplychainassociation.org/about-us/what-is-gpo/> (last visited Oct. 27, 2022).
- ⁵⁶ *FAQ*, HSCA, <https://supplychainassociation.org/about-us/faq/> (last visited Oct. 27, 2022).
- ⁵⁷ *Top 10 GPOs by staffed beds*, DEFINITIVE HEALTHCARE, <https://www.definitivehc.com/blog/top-10-gpos-by-staffed-beds> (last visited Oct. 27, 2022).
- ⁵⁸ *Vizient Recognizes Members for Supply Chain Savings*, VIZIENT (Aug. 31, 2021), <https://newsroom.vizientinc.com/vizient-recognizes-members-for-supply-chain-savings.htm>.